

REMARKS

This application contains claims 1-41. Claims 19-21 are canceled without prejudice. Claims 1, 10, 12, 16, 22-26, 39 and 41 are hereby amended. No new matter has been introduced. Reconsideration is respectfully requested.

Applicant thanks Examiner Puente for the courtesy of a telephone interview with Applicant's representatives, Daniel Kligler (Reg. No. 41,120) and Yuval Shalom, on October 13, 2009. The interview focused on the 35 U.S.C. 102(e) rejection over Osaki (U.S. Patent Application Publication 2006/0075148), and the 35 U.S.C. 103(a) rejection over Wahl et al. (U.S. Patent 6,324,654, hereinafter Wahl) in view of Kikinis (U.S. Patent 5,623,597).

Regarding the rejection over Osaki, Applicant's representatives argued that Osaki does not teach or suggest a disaster-proof storage unit of any kind. The Examiner indicated that since Osaki refers to remote storage, his system inherently possesses some disaster-proof qualities. Nevertheless, agreement was reached that any disaster-proof property in Osaki must stem from the remote site alone, and that Osaki's primary site is not disaster-proof in any way. The Examiner agreed that amending the claims to indicate clearly that the disaster-proof storage unit is collocated with the primary storage device at the primary site would distinguish over Osaki. Applicant has amended independent claims 1, 22-24 and 41 in this application accordingly.

Regarding the rejection over Wahl in view of Kikinis, Applicant's representatives argued that Wahl's system performs disaster recovery using only the data in the remote site, since no data in the local site can be assumed to have survived the disaster. In particular, Wahl's writelog does not play any role during disaster

recovery, and therefore making the writelog fireproof, such as using Kikinis's methods, would not produce a system that carries out the claimed invention.

Applicant's representatives further argued that the concept of temporarily storing data in a disaster-proof storage unit at the local site, and using this data together with the data of the remote site for recovery, as described in the claims of this application, is not taught or suggested in the prior art. The Examiner indicated that this argument appears to be persuasive, and agreed to reconsider the rejection over Wahl in view of Kikinis.

In the Official Action, claims 10, 12-16 and 25-40 were rejected over 35 U.S.C. 112, second paragraph, for indefiniteness. Regarding claim 10, the Examiner indicated that the term "transmitting the record" has no antecedent basis. Applicant has amended claim 10 to depend from claim 9 instead of claim 7, as originally intended and as suggested by the Examiner, and thanks the Examiner for pointing out this typographical error.

Regarding claims 12-16 and 25-40, the Examiner stated that the step of "predicting the event" in these claims does not make sense because the independent claims recite that the event actually occurs. Applicant maintains that the original claims are definite and logical, and that the "predicting" step refers to an earlier point in time, before the event actually occurs. The fact that an event occurs at a certain point in time does not mean it cannot be predicted at an earlier time. The "predicting" step and the "when an event... occurs" simply refer to different points in time. Nevertheless, Applicant has amended claims 12, 25 and 26 to recite clearly that the prediction is performed before the event occurs. The language added to these claims is supported in the specification, such as in paragraphs [0100] and [0130]-[0134]. (Paragraph numbers

throughout this amendment refer to the published version of the application, U.S. 2009/0216969.)

Applicant believes that claims 10, 12-16 and 25-40 now meet the requirements of 35 U.S.C. 112, and requests that the rejection be withdrawn.

Claims 1, 4-5, 22-24 and 41 were rejected under 35 U.S.C. 102(e) over Osaki (U.S. Patent Application Publication 2006/0075148). While disagreeing with the grounds of rejection, Applicant has amended independent claims 1, 22-24 and 41, as agreed in the interview, in order to sharpen the distinction of the present invention over the cited art. Amended claim 1 recites that the primary storage device is located at a local site, that the secondary storage device is located at a remote site, and that the disaster-proof storage unit is collocated with the primary storage device at the local site. The language added to the claims is supported in the specification, for example in paragraph [0081] and Figs. 1A-1C.

Osaki, on the other hand, describes a method for testing a remote storage system, which does not include any kind of disaster-proof storage unit. In rejecting claim 1, the Examiner cited paragraph [0021] in Osaki as allegedly describing storage in a disaster-proof storage unit. The cited passage, however, refers to a front-end volume in Osaki's system, which has no disaster-proof properties whatsoever.

The Examiner further alleged that Osaki teaches data reconstruction based on the record stored in the disaster-proof storage unit and at least part of the data stored in the secondary storage device. To explain this statement, the Examiner wrote (on page 4 of the Official Action): "It is understood that if a disaster were to occur at the primary storage site, data at the front end volume would

still be able to be sent to the secondary volume, thus updating or reconstructing the data at the secondary volume."

Even if it were assumed, for the sake of argument, that the Examiner's statement was correct, it does not mean that Osaki teaches the above-mentioned feature of claim 1. In Osaki's system, both the front end volume and the secondary volume are located at the secondary storage system (see, for example, Osaki's Figs. 1-4). Therefore, sending data from the front end volume to the secondary volume amounts to simply moving data inside the secondary site. Nothing in Osaki teaches or suggests data reconstruction based on a record stored in a disaster-proof storage unit located at the primary site and data stored in a secondary storage device at the secondary site, as agreed in the interview and recited in amended claim 1. Thus, amended claim 1 is patentable over Osaki, as are claims 4 and 5, which depend from claim 1.

Independent claims 22-24 and 41 recite methods, apparatus and computer software product, which all use a disaster-proof storage unit at the primary site in a similar manner to claim 1. Applicant has amended these independent claims in a like manner to the amendment of claim 1. Thus, claims 22-24 and 41 are also patentable over Osaki for the reasons given above.

Claims 19-21 were rejected under 35 U.S.C. 102(e) over Monroe (U.S. Patent Application Publication 2004/0230352). While disagreeing with the grounds of rejection, Applicant has canceled claims 19-21 in order to expedite prosecution of the remaining claims, and the rejection is therefore moot. Applicant reserves the right to prosecute the subject matter of these claims in one or more continuing applications.

Claims 2 and 3 were rejected under 35 U.S.C. 103(a) over Osaki in view of alleged Applicant's Admitted Prior Art (AAPA). These claims depend from independent claim 1, which was amended and is now patentable over Osaki. The alleged AAPA cited by the Examiner merely refers to asynchronous mirroring techniques and does not supply the teachings that are missing from Osaki. In view of the patentability of amended claim 1 over Osaki, claims 2 and 3 are patentable over Osaki in view of AAPA.

Claims 1, 3-8, 17, 22-24 and 41 were rejected under 35 U.S.C. 103(a) over Wahl et al. (U.S. Patent 6,324,654, hereinafter Wahl) in view of Kikinis (U.S. Patent 5,623,597). Applicant respectfully traverses this rejection.

Wahl describes a remote data mirroring system, which writes update data both to a local data device and to a local journal storage area, referred to as a writelog device. A primary mirror daemon on a local computer system monitors the writelog device for data updates, and feeds the data over a network to a receiving remote mirror daemon on a remote computer system. The remote mirror daemon commits the data updates to a mirror device.

Kikinis describes a data storage system housed in a fireproof enclosure, and was cited by the Examiner only to show an example of a disaster-proof storage unit.

In rejecting claim 1, the Examiner took the position that the operation of Wahl's writelog device is similar to that of the disaster-proof storage unit recited in claim 1, and that combining Kikinis's fireproof data storage system with Wahl's data mirroring system would produce a system that carries out the method of claim 1. Wahl's solution, however (as explained in the interview, summarized above), is conceptually different from the method of claim 1, and combining it with Kikinis's

fireproof device would not result in a system that carries out the method of claim 1.

In Wahl's system, data recovery following a disaster is based only on the data that is already committed in the mirror storage device. Data that is in the process of being transferred to the mirror device, such as the data in the writelog device, is lost. Wahl states this problem explicitly, and admits he cannot foresee a better solution: "One drawback is that in the event of a disaster, the data on the secondary computer system may be up to several seconds older than what would be found on the primary computer system. However, this trade-off between application performance and data synchronicity presents the optimal compromise available between the two requirements" (col. 4, lines 19-25). Wahl's acceptance of this performance compromise represents what was universally believed in the storage art prior to the present invention.

The method of claim 1, on the other hand, solves the problem of data recovery without compromise by using both the record stored in the disaster-proof storage unit (which is located at the primary site) and the data in the secondary storage device. Since the disaster-proof storage unit is located at the primary site, the records stored in it are current and up-to-date. By using the up-to-date records of the disaster-proof unit for reconstruction, the method of claim 1 achieves perfect data reconstruction without data loss and regardless of any time lag between the primary and secondary storage devices. This feature is discussed in the specification of the present patent application, for example in paragraphs [0008], [0076] and [0089]-[0090].

This sort of perfect reconstruction is enabled by the fact that (1) the temporary storage unit is located at the

primary site but nevertheless survives the disaster, and (2) data recovery uses the records stored in this unit. Wahl's system does not meet any of these conditions, and therefore cannot possibly achieve perfect reconstruction, as Wahl himself admits.

Moreover, replacing Wahl's writelog device with Kikinis's fireproof storage system would not produce a system that carries out the method of claim 1. There is no teaching or suggestion in Wahl that the contents of the writelog device could possibly be used in recovering data (for the simple reason that the writelog device cannot be assumed to survive a disaster). Kikinis cannot possibly complete these missing teachings, since it is not related to remote mirroring. The only basis for even considering that information stored only at the primary storage site could possibly be used in recovering from a disaster at that same site is hindsight from the teachings of the present patent application.

In summary, Wahl and Kikinis, alone or in combination, do not teach or suggest reconstructing data using records stored in a disaster-proof storage unit collocated with the primary storage device, and at least part of the data stored in the secondary storage device, as recited in claim 1. Claim 1 is thus believed to be patentable over the cited art.

Claims 3-8 and 17 depend, directly or indirectly, from claim 1. In view of the patentability of claim 1, these dependent claims are patentable over the cited art, as well

Independent claims 22-24 and 41 recite methods, apparatus and computer software product, which all use a disaster-proof storage unit at the primary site in a similar manner to claim 1. In view of the patentability of

claim 1, these independent claims are also patentable over Wahl in view of Kikinis for the reasons explained above.

Furthermore, notwithstanding the arguments presented above, the invention recited in the claims of the present patent application is objectively non-obvious, in that it answers a long-felt need that was recognized, persistent and not solved by others (MPEP 716.04): How to provide disaster protection with both fast storage response and zero data loss? Wahl himself defined the problem, and the perception of experts that it was unsolvable, in the passage reproduced above (col. 4, lines 19-25).

In support of this point, Applicant submits herewith a Declaration under 37 CFR 1.132 by an independent expert in the field, David Vellante. The Declaration provides evidence of the need for the present invention and shows how the Phoenix product, which is produced by the assignee of the present patent application and embodies the claimed invention, answers this need.

Claim 2 was rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, and further in view of alleged AAPA. Applicant respectfully traverses this rejection. Claim 2 depends from claim 1, and the alleged AAPA cited by the Examiner does not supply the features missing from the other references, as explained above. In view of the patentability of claim 1 over Wahl in view of Kikinis, claim 2 is believed to be patentable over Wahl in view of Kikinis and AAPA.

Claims 9 and 10 were rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, and further in view of Ozluturk et al. (U.S. Patent 5,841,768, hereinafter Ozluturk). Ozluturk describes a method for establishing a wireless communication link, and has nothing to do with data storage systems. Claims 9 and 10 depend indirectly from claim 1. In view of the patentability of claim 1 over



Wahl in view of Kikinis, claims 9 and 10 are patentable over Wahl in view of Kikinis and Ozluturk.

Claim 11 was rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, and further in view of Abbruscato (U.S. Patent 7,148,802). Abbruscato describes a hand-held direction finder, and is not related to data storage systems. Claim 11 depends indirectly from claim 1. In view of the patentability of claim 1 over Wahl in view of Kikinis, claim 11 is patentable over Wahl in view of Kikinis and Abbruscato.

Claims 12-13, 15-16, 25-31, 36 and 38-40 were rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, and further in view of Vega et al. (U.S. Patent 7,383,405, hereinafter Vega). Vega describes methods for migrating virtual machines between hosts. Although Vega mentions disaster recovery as a possible application, it has nothing to do with storage in a disaster-proof storage unit. Claims 12-13, 15-16 and 25 depend, directly or indirectly, from claims 1 or 24. In view of the patentability of claims 1 and 24 over Wahl in view of Kikinis, claims 12-13, 15-16 and 25 are patentable over Wahl in view of Kikinis and Vega.

Independent claim 26 recites a data protection apparatus, which includes a disaster-proof storage unit. Applicant has amended claim 26 to recite that the disaster-proof storage unit is collocated with the primary storage device at the primary site. As explained above, this feature is not taught by Wahl or Kikinis. Vega does not supply these missing teachings. Therefore, amended claim 26 is patentable over Wahl in view of Kikinis and Vega. Claims 27-31, 36 and 38-40 depend from claim 26. In view of the patentability of claim 26, these claims are also patentable over Wahl in view of Kikinis and Vega for the reasons explained above.

Claims 14 and 37 were rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, Vega and alleged AAPA. Claims 14 and 37 depend respectively from independent claims 1 and 26, which are patentable over Wahl in view of Kikinis and Vega, as explained above. The alleged AAPA cited by the Examiner does not supply the features missing from the other references, since it merely refers to asynchronous mirroring techniques. In view of the patentability of claims 1 and 26 over Wahl in view of Kikinis and Vega, claims 14 and 37 are patentable over Wahl in view of Kikinis, Vega and the alleged AAPA.

Claim 18 was rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, and further in view of Crockett et al. (U.S. Patent 6,105,078, hereinafter Crockett). Crockett describes a data mover, which monitors consistency time and idle time in a remote copying system, and manages data accuracy in the system. Crockett does not mention a disaster-proof storage unit of any kind. Claim 18 depends from claim 1. In view of the patentability of claim 1 over Wahl in view of Kikinis, claim 18 is patentable over Wahl in view of Kikinis and Crockett.

Claims 32 and 33 were rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, Vega and Ozluturk. Claims 32 and 33 depend indirectly from independent claim 26. As explained above, claim 26 is patentable over Wahl in view of Kikinis and Vega. Ozluturk does not supply the teachings missing from the other references. In view of the patentability of claim 26 over Wahl in view of Kikinis and Vega, claims 32 and 33 are patentable over Wahl in view of Kikinis, Vega and Ozluturk.

Claim 34 was rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, Vega and Abbruscato. Claim 34 depends indirectly from independent claim 26. As explained above, claim 26 is patentable over Wahl in view of Kikinis

and Vega. Abbruscato does not supply the teachings missing from the other references. In view of the patentability of claim 26 over Wahl in view of Kikinis and Vega, claim 34 is patentable over Wahl in view of Kikinis, Vega and Abbruscato.

Claim 35 was rejected under 35 U.S.C. 103(a) over Wahl in view of Kikinis, Vega and Crockett. Claim 35 depends from independent claim 26. As explained above, claim 26 is patentable over Wahl in view of Kikinis and Vega. Crockett does not supply the teachings missing from the other references. In view of the patentability of claim 26 over Wahl in view of Kikinis and Vega, claim 35 is patentable over Wahl in view of Kikinis, Vega and Crockett.

Applicant believes the amendments and remarks presented hereinabove to be fully responsive to all of the grounds of rejection raised by the Examiner. In view of these amendments and remarks, Applicant respectfully submits that all of the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

Respectfully submitted,

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